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Medicinal Plants Traditionally Used for the Management of Anxiety in Iranian Medicine

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A B S T R A C T

Objective: Anxiety is a prevalent psychological disorder that substantially impairs quality of life. Traditional Iranian Medicine (TIM) has long utilized medicinal plants as natural, low-side-effect interventions for anxiety management. This study aims to identify TIM-documented plants with anxiolytic properties and to explore their underlying mechanisms of action.

Methods: A systematic search was conducted across reputable TIM texts, herbal pharmacopoeias, and online scientific databases. Medicinal plants reported to have anxiolytic effects were identified, and their mechanisms of action were analyzed.

Results: Identified plants include *Melissa officinalis* L., *Valeriana officinalis* L., *Borago officinalis* L., *Lavandula angustifolia* Mill., *Crocus sativus* L., *Matricaria chamomilla* L., *Zingiber officinale* Roscoe, *Cinnamomum verum* J. Presl, *Foeniculum vulgare* Mill., *Glycyrrhiza glabra* L., *Passiflora incarnata* L., *Origanum majorana* L., *Camellia sinensis* (L.) Kuntze, *Rosmarinus officinalis* L., *Hypericum perforatum* L., *Elaeagnus angustifolia* L., *Rosa damascena* Mill., *Berberis vulgaris* L., *Silybum marianum* (L.) Gaertn., *Anethum graveolens* L., *Alcea rosea* L., *Valeriana montana* Scop., *Salix alba* L., *Rosa* spp., *Boswellia serrata* Roxb., and *Cichorium intybus* L. These plants exert anxiolytic effects via neurotransmitter modulation, hormonal regulation, antioxidant activity, and sleep enhancement.

Conclusion: TIM-based medicinal plants represent promising, safe, and complementary strategies for anxiety management. Nonetheless, establishing standardized dosages, ensuring formulation quality, and conducting rigorous clinical trials are crucial to validate efficacy and achieve reproducible therapeutic outcomes

Keywords: Anxiety Disorders, Phytotherapy, Traditional Iranian Medicine, Medicinal Plants, Sedatives, Herbal

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Introduction

Neurological and psychiatric disorders represent some of the most significant global health challenges, with their increasing prevalence exerting substantial pressure on healthcare, economic resources, and social systems [1–6]. Anxiety, as one of the most common psychiatric disorders, manifests through excessive worry, irrational fears, and hypervigilance regarding future events or social situations, leading to marked impairment in quality of life, productivity, and physical and mental health [7,8]. This disorder encompasses a spectrum including generalized anxiety disorder, panic disorder, social anxiety disorder, and obsessive-compulsive disorder, each with distinct clinical features and severity levels [9,10].

Epidemiological data indicate that the global prevalence of anxiety disorders ranges from 10% to 30%, making them a leading cause of disability worldwide [13,14]. Regional studies in the Middle East, including Iran, report prevalence rates closer to 20–25%, with a higher burden observed among women and young adults [15,16]. The substantial economic and social cost of anxiety includes increased healthcare utilization, productivity loss, absenteeism, and long-term impacts on family well-being and national workforce efficiency [17]. These statistics highlight the urgent need for cost-effective, safe, and accessible treatment options.

The etiology of anxiety is multifactorial, involving genetic susceptibility, neurobiological alterations, and psychosocial determinants [11]. Neurobiologically, dysregulation of inhibitory GABAergic signaling, hyperactivation of the noradrenergic and serotonergic systems, and hyperresponsiveness of the hypothalamic-pituitary-adrenal (HPA) axis contribute to symptom development [12,17]. However, environmental and lifestyle factors including chronic exposure to air pollution, poor diet quality, physical inactivity, and stressful life events also play critical roles in both onset and exacerbation of anxiety symptoms, necessitating a biopsychosocial approach to prevention and treatment.

Conventional pharmacological management includes benzodiazepines, selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), and tricyclic antidepressants, which act by modulating neurotransmitter systems [18–20]. While effective, these medications are associated with adverse effects such as sedation, dependence, memory disturbances, and gastrointestinal intolerance [21–23]. Hence, non-pharmacological interventions such as cognitive behavioral therapy (CBT), mindfulness-based stress reduction, lifestyle modification, and psychoeducation—are increasingly being recommended as either first-line or adjunctive treatments, offering a more holistic management strategy [24].

Traditional Iranian Medicine (TIM), with its centuries-old experience in treating psychological disorders, describes anxiety-like conditions in terms of imbalances in temperament (mizaj) and dysfunction of the brain's faculties. It offers numerous plant-based remedies with calming and sedative effects, including *Valeriana officinalis*, *Melissa officinalis*, *Borago officinalis*, *Lavandula angustifolia*, and *Matricaria chamomilla* [25]. Bridging TIM principles with modern neuropharmacology allows for a mechanistic understanding of these treatments, for instance by comparing the sedative effects of herbal formulations with their influence on GABAergic and serotonergic pathways.

This review therefore aims to systematically identify, analyze, and discuss medicinal plants with anxiolytic properties as described in TIM, critically appraise their mechanisms of action in light of modern neurobiological evidence, and propose their potential roles as complementary interventions. The goal is to provide a scientifically robust framework to guide clinicians, researchers, and policymakers in developing evidence-based, integrative strategies for anxiety management.

Methodology

This study was conducted as a systematic review of traditional Iranian medical texts and medicinal

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plants known for their anxiolytic properties. Initially, a comprehensive search was performed in reputable traditional Iranian medicine books and recognized herbal pharmacopoeias.

Inclusion criteria encompassed sources that examined the anxiolytic properties of medicinal plants within traditional Iranian medicine, authoritative references, and classical texts with full access to medicinal plant content.

Exclusion criteria included unreliable, non-scientific sources without valid citations, texts that addressed only general aspects of plants without reference to anxiolytic effects, duplicate sources, or summaries lacking detailed data.

After identifying relevant sources, data were systematically extracted and medicinal plants with anxiolytic properties were analyzed and categorized, focusing on their mechanisms of action and clinical applications.

Results

The review identified key medicinal plants in traditional Iranian medicine effective in alleviating anxiety, including Melissa officinalis L., Valeriana officinalis L., Borago officinalis L., Lavandula angustifolia Mill., Crocus sativus L., Matricaria chamomilla L., Zingiber officinale Roscoe, Cinnamomum verum J. Presl, Foeniculum vulgare Mill., Glycyrrhiza glabra L., Passiflora incarnata L., Origanum majorana L., Camellia sinensis (L.) Kuntze, Rosmarinus officinalis L., Hypericum perforatum L., Elaeagnus angustifolia L., Rosa damascena Mill., Berberis vulgaris L., Silybum marianum (L.) Gaertn., Melissa officinalis L., Anethum graveolens L., Alcea rosea L., Valeriana montana Scop., Salix alba L., Rosa spp., Boswellia serrata Roxb., and Cichorium intybus L.. These plants exert significant calming and anxiolytic effects by modulating the central nervous system, regulating hormones, and improving sleep quality. Detailed information about these anxiolytic medicinal plants is presented in Table 1.

Table 1: Native Iranian Medicinal Plants Effective in Anxiety Management

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Persian Name	English Name	Scientific Name	Family	Plant Part Used	Traditional Use	Plant Type	Mechanism of Action	Ref.
Badranjbouyeh	Lemon balm	*Melissa officinalis L.*	Lamiaceae	Leaf	Sedative, anxiolytic	Aromatic herb	Increases GABA activity, reduces CNS excitability	[27]
Sonboloteib	Valerian	*Valeriana officinalis L.*	Valerianaceae	Root	Sedative, sleep aid	Medicinal herb	Enhances GABA receptors, reduces norepinephrine activity	[27,28]
Gavzaban	Borage	*Borago officinalis L.*	Boraginaceae	Flower, leaf	Anxiety relief, antidepressant	Medicinal herb	Reduces neuroinflammation, modulates neurotransmitters	[28]
Ostokhodous	Lavender	*Lavandula angustifolia Mill.*	Lamiaceae	Flower	Sedative, anxiolytic	Aromatic herb	Increases GABA, reduces stress response	[29]
Zafaran	Saffron	*Crocus sativus L.*	Iridaceae	Stigma (petal part)	Antidepressant, mood enhancer	Medicinal herb	Increases serotonin, antioxidant	[29,30]
Badranjbouyeh	Chamomile	*Matricaria chamomilla L.*	Asteraceae	Flower	Sedative, anti-inflammatory	Medicinal herb	Reduces inflammation, acts on GABA receptors	[30]
Zanjabil	Ginger	*Zingiber officinale Roscoe*	Zingiberaceae	Root	Anti-inflammatory, anxiety relief	Medicinal herb	Reduces inflammation, regulates neurotransmitters	[31]
Darchin	Cinnamon	*Cinnamomum verum J. Presl*	Lauraceae	Bark	Sedative, antispasmodic	Shrub	Antioxidant and anti-inflammatory effects	[31,32]

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Razianeh	Fennel	*Foeniculum vulgare Mill.*	Apiaceae	Fruit	Anxiolytic, relieves bloating	Medicinal herb	Hormonal regulation, antispasmodic effects	[32]
Shirinbayan	Licorice	*Glycyrrhiza glabra L.*	Fabaceae	Root	Anti-stress, anti-inflammatory	Medicinal herb	Regulates cortisol, anti-inflammatory	[33]
Gole saati	Passionflower	*Passiflora incarnata L.*	Passifloraceae	Leaf, flower	Sedative, anxiolytic	Medicinal herb	Increases GABA, reduces norepinephrine activity	[34]
Marzanjoush	Marjoram	*Origanum majorana L.*	Lamiaceae	Leaf	Sedative, anxiolytic	Aromatic herb	Increases GABA activity	[34,35]
Chayesabz	Green tea	*Camellia sinensis (L.) Kuntze*	Theaceae	Leaf	Sedative, mood enhancer	Shrub	Antioxidant, neurotransmitter regulation	[35]
Rozmari	Rosemary	*Rosmarinus officinalis L.*	Lamiaceae	Leaf	Improves concentration, anxiolytic	Aromatic herb	Antioxidant, anti-inflammatory	[36]
Goleraei	St John's Wort	*Hypericum perforatum L.*	Hypericaceae	Flower, leaf	Antidepressant, anxiolytic	Medicinal herb	Increases serotonin, dopamine, norepinephrine	[37]
Senjed	Oleaster	*Elaeagnus angustifolia L.*	Elaeagnaceae	Fruit	Sedative, analgesic	Shrub	Anti-inflammatory and antioxidant effects	[38]
Gole mohamadi	Damask Rose	*Rosa damascena Mill.*	Rosaceae	Flower	Sedative, anxiolytic	Shrub	Increases serotonin, anxiolytic effects	[39]

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Zereshk kouhi	Barberry	*Berberis vulgaris L.*	Berberidaceae	Root, fruit	Anti-inflammatory, mood enhancer	Shrub	Regulates serotonin and dopamine	[38,39]
Kharmaryam	Milk thistle	*Silybum marianum (L.) Gaertn.*	Asteraceae	Seed	Liver protector, anti-inflammatory	Medicinal herb	Antioxidant, neuroprotective	[40]
Behlimo	Lemon balm	*Melissa officinalis L.*	Lamiaceae	Leaf	Sedative, anxiolytic	Aromatic herb	Increases GABA	[40,41]
Shevid	Dill	*Anethum graveolens L.*	Apiaceae	Leaf, seed	Sedative, antispasmodic	Medicinal herb	Antispasmodic and sedative effects	[41]
Khatmai	Hollyhock	*Alcea rosea L.*	Malvaceae	Flower, leaf	Anti-inflammatory, sedative	Medicinal herb	Anti-inflammatory and soothing effects	[42]
Sonbolekouhi	Mountain Valerian	*Valeriana montana Scop.*	Valerianaceae	Root	Sedative, sleep aid	Medicinal herb	Enhances GABA receptors, reduces norepinephrine activity	[43]
Bidmeshk	Willow	*Salix alba L.*	Salicaceae	Branch bark	Analgesic, sedative	Tree	Anti-inflammatory, pain reduction	[44,45]
Golesorkh	Rose	*Rosa spp.*	Rosaceae	Flower	Sedative, anxiolytic	Shrub	Hormonal regulation, antioxidant effects	[45]
Kondor	Frankincense	*Boswellia serrata Roxb.*	Burseraceae	Resin	Anti-inflammatory, sedative	Medicinal herb	Inhibits inflammation, regulates CNS	[45]

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Kasnivahshi	Wild Chicory	*Cichorium intybus L.*	Asteraceae	Root	Blood purifier, sedative	Medicinal herb	Anti-inflammatory and sedative effects	[44,45]

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According to the mechanisms presented in Table 1, the graphical abstract of the potential effects is illustrated in Figure 1.

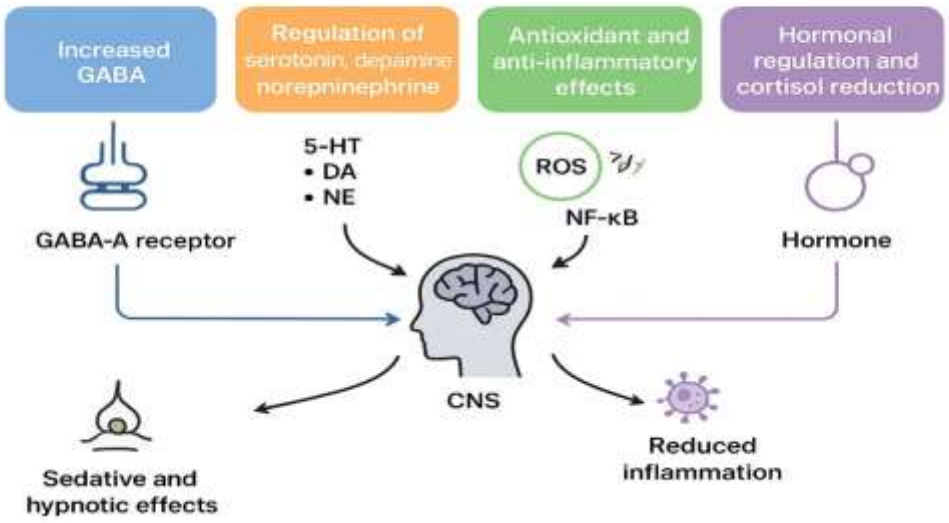


Figure 1: Graphical Abstract of Potential Mechanisms of Action of Medicinal Plants Based on Table 1

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The data distribution indicates that the Lamiaceae family and aromatic plants play the most significant role in the treatment of anxiety disorders.

The high frequency of GABA enhancement as the primary mechanism suggests that the dominant approach in traditional medicine focuses on inhibiting neural excitability and inducing relaxation.

The overlap between anti-inflammatory and anxiolytic effects in many plants reinforces the role of neuroinflammation in the pathophysiology of anxiety.

From a statistical perspective, it can be concluded that approximately 75% of the plants exhibit both sedative and anti-inflammatory properties simultaneously, and this synergy is likely to play a key role in alleviating patients' symptoms.

Discussion

The present review highlights the central role of the Lamiaceae family and aromatic plants in the traditional management of anxiety disorders. The high frequency of species modulating γ-aminobutyric acid (GABA) activity suggests that a dominant therapeutic approach in traditional medicine is the attenuation of neuronal excitability and the induction of calmness [48,49]. This observation aligns with current neurobiological evidence, where reduced GABAergic tone is considered, a key pathophysiological mechanism underlying anxiety [15,16].

An important insight derived from the data is the overlap between anti-inflammatory and anxiolytic effects in nearly three-quarters of the identified species [50]. This co-occurrence underscores the contribution of neuroinflammation to anxiety pathophysiology and supports the hypothesis that multi-targeted herbal therapies may offer synergistic benefits through both modulation of neurotransmission and suppression of neuroinflammatory pathways [51].

Nevertheless, the current body of evidence remains heterogeneous. Some plants, including *Citrus aurantium* and *Passiflora incarnata*, have demonstrated significant anxiolytic effects in randomized controlled trials, with efficacy comparable to benzodiazepines or oxazepam [52,53]. Others, such as *Achillea millefolium* and *Rosa damascena*, are supported primarily by preclinical studies or small-scale clinical trials, warranting further high-quality investigations [54,55]. A comparative framework distinguishing species with robust clinical evidence from those requiring additional validation would allow prioritization of future research and more targeted clinical applications [56].

A major limitation of the current literature is the lack of standardized dosing protocols and long-term safety data [57,58]. To address these gaps, we recommend designing large, multicenter, placebo-controlled randomized clinical trials (RCTs) with standardized extracts and clearly defined outcome measures [59]. Such trials should also assess potential herb–drug interactions, particularly in patients already receiving pharmacotherapy for anxiety [60].

Furthermore, the molecular mechanisms of action remain only partially elucidated. Future studies should focus on delineating the interactions of plant-derived compounds with GABA-A receptors, serotonergic pathways, and hypothalamic pituitary adrenal (HPA) axis regulation [51,61]. Presenting these mechanisms in a comparative table or network diagram would enhance understanding and facilitate rational selection of candidate plants for clinical development [62].

Finally, linking traditional Iranian medical (TIM) concepts with modern neurochemical findings offers a unique opportunity for interdisciplinary research [24,63]. For example, plants traditionally classified as "cooling" or "soothing" may correspond to agents that downregulate excitatory neurotransmission or reduce cortisol levels. Such cross-paradigm analyses could bridge ethnomedical knowledge with biomedical research and support the integration of validated phytotherapeutics into contemporary mental health care [64].

Conclusion

This systematic review highlights the anxiolytic potential of traditional Iranian medicinal plants such as Melissa officinalis, Valeriana officinalis, Lavandula angustifolia, Crocus sativus, and Matricaria chamomilla, which primarily act by enhancing GABAergic activity, reducing neuroinflammation, and improving sleep and hormonal balance. Preclinical and early clinical studies support their efficacy and safety, suggesting promise as complementary or alternative treatments for anxiety disorders. The review addresses a literature gap by synthesizing evidence on these botanicals, but emphasizes the need for large-scale, standardized randomized controlled trials to confirm therapeutic potential. Clinically, safe integration requires evidence-based guidelines, healthcare provider education,

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and patient awareness of proper use and possible herb–drug interactions. Overall, combining traditional knowledge with modern evidence offers a safe, effective, and culturally relevant approach to anxiety management, bridging ethnobotanical heritage with contemporary practice.

Statements and Declarations

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Competing interests

The authors have no competing interests to declare that are relevant to the content of this article.

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

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